ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

STRONTIUM
CAS #7440-24-6

Division of Toxicology ToxFAQs™ **July 2001**

This fact sheet answers the most frequently asked health questions (FAQs) about strontium. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to stable or radioactive strontium occurs from ingesting contaminated food or drinking water or breathing contaminated air. In children, high levels of stable strontium can impair bone growth. High levels of radioactive strontium can cause anemia or cancer. Strontium has been found at 101 of the 1,585 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is strontium?

Strontium is a naturally occurring element found in rocks, soil, dust, coal, and oil. Naturally occurring strontium is not radioactive and is referred to as stable strontium. Stable strontium in the environment exists in four stable isotopes, ^{84}Sr (read as strontium eighty-four), ^{86}Sr, ^{87}Sr, ^{88}Sr.

Strontium compounds are used in making ceramics and glass products, pyrotechnics, paint pigments, fluorescent lights, and medicines.

Strontium can also exist as several radioactive isotopes, the most common is ^{90}Sr. ^{90}Sr is formed in nuclear reactors or during the explosion of nuclear weapons. Radioactive strontium generate beta particles as they decay. One of the radioactive properties of strontium is half-life, or the time it takes for half of the isotope to give off its radiation and change into another substance. The half-life of ^{90}Sr is 29 years.

What happens to strontium when it enters the environment?

❑ In air, stable strontium is present as dust which eventually settles over land and water.
❑ Stable strontium dissolves in water
❑ Stable strontium in soil can dissolve in water and move deeper in the soil to underground water.
❑ Radioactive decay is the only way of decreasing the amount of ^{90}Sr in the environment.

How might I be exposed to strontium?

❑ You can be exposed to low levels of stable strontium and radioactive strontium by breathing air, eating food, or drinking water.
❑ Food and drinking water are the largest sources of exposure to strontium.
❑ You can be exposed to radioactive strontium if you eat food that was grown in contaminated soil.
❑ Living near uncontrolled radioactive waste sites containing strontium.

How can strontium affect my health?

Exposure to low levels of stable strontium has not been shown to affect adult health, but may harm children (see following section).

Breathing or ingesting high levels of radioactive strontium can damage bone marrow and cause anemia and prevent the blood from clotting properly.

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How likely is strontium to cause cancer?

The only stable strontium compound that may cause cancer is strontium chromate, but this is due to chromium not strontium.

Exposure to high levels of radioactive strontium may cause cancer. Leukemia has been seen in humans exposed to relatively large amounts of strontium. Leukemia and cancers of the bone, nose, lung, and skin have also been seen in laboratory animals.

The International Agency for Research on Cancer (IARC) has determined that radioactive strontium is a human carcinogen.

How can strontium affect children?

We do not know if exposure to strontium will result in birth defects or other developmental effects in people. Birth defects have been observed in animals exposed to radioactive strontium.

Exposure to high levels of stable strontium can result in impaired bone growth in children.

Children may be more susceptible than adults to the harmful effects of radioactive strontium.

How can families reduce the risk of exposure to strontium?

❑ Having a balanced diet with sufficient amounts of vitamin D, calcium, and protein will reduce the amount of strontium that is absorbed.

Is there a medical test to show whether I've been exposed to strontium?

All people have small amounts of stable strontium in their bodies. There are tests to measure the level of strontium in blood, hair, feces, and urine. These tests are most useful for people exposed to high levels. These tests cannot determine the exact levels of strontium you may have been exposed to or predict how the levels in your tissues will affect your health.

If a person has been exposed to radioactive strontium, special tests can be used to measure levels of radiation in blood, feces, or urine. These tests are most useful when done soon after exposure, since radioactive strontium is quickly incorporated into bone and its release from bone occurs in very small amounts over a period of years.

Has the federal government made recommendations to protect human health?

EPA has set a limit of 4000 µg strontium per liter of drinking water (4000 µg/L).

EPA has set a limit of 8 picocuries ^{90}Sr per liter of drinking water (8 pCi/L).

The Nuclear Regulatory Commission (NRC) has set a limit of 20 µCi per year for on-the-job exposure to ^{90}Sr in air.

Source of Information

Agency for Toxic Substances and Disease Registry (ATSDR). 2001. Toxicological Profile for Strontium (Draft for Public Comment). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.